REMARKS

Applicants request favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 1, 3, 5-8, 13-15, 17-25 and 34-36 are presented for consideration. Claims 1, 15, 17, 18, 21, 22, 34 and 36 are independent. Claims 4, 9-12, 16 and 26-33 have been canceled without prejudice or disclaimer. Claims 1, 5 and 15 have been amended to clarify features of the subject invention, while claims 34-36 have been added to recite additional features of the subject invention. Support for these changes and claims can be found in the original application, as filed. Therefore, no new matter has been added.

Applicants note that the Examiner has withdrawn newly presented claims 26-33 from consideration as being directed to a non-elected invention. To expedite prosecution, these claims have been canceled without prejudice or disclaimer. Claims 17-22 also were the subject of a restriction requirement. Applicants have retained these claims in this application in order to preserve their rights.

Applicants request that the Examiner contact their undersigned representative should it be necessary to cancel these claims in order to advance the subject application to issue.

Applicants request favorable reconsideration and withdrawal of the objection and rejections set forth in the above-noted Office Action.

Claims 4 and 5 were objected to due to minor informalities. Claim 4 has been canceled without prejudice or disclaimer. Claim 5 has been amended in light of the Examiner's

comments. Applicants submit, therefore, that this objection has been overcome and should withdrawn. Such favorable indication is requested.

Claims 4, 5, 9, 10 and 16 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claims 4, 9, 10 and 16 have been canceled without prejudice or disclaimer. Claim 5 has been amended in light of the Examiner's comments. Applicants submit, therefore, that this rejection likewise has become moot and should be withdrawn. Such favorable indication is requested.

Turning now to the art rejections, claims 1, 3, 6, 11-16 and 25 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,078,599 to Everage et al. Claim 5 was rejected under 35 U.S.C. § 103 as being unpatentable over the Everage et al. patent in view of U.S. Patent No. 4,905,041 to Aketagawa. Claims 7 and 8 were rejected under 35 U.S.C. § 103 as being unpatentable over the Everage et al. patent in view of U.S. Patent No. 5,420,877 to Sandstrom Claims 23 and 24 were rejected under 35 U.S.C. § 103 as being unpatentable over the Everage et al. patent in view of U.S. Patent No. 6,434,173 to Tuganov et al. Applicants submit that the cited art, whether taken individually or in combination, does not teach many features of the present invention, as recited in the claims. Therefore, these rejections are respectfully traversed. Nevertheless, Applicants submit that independent claims 1, 15, 34 and 36, for example, as presented, amplify the distinctions between the present invention and the cited art.

In one aspect of the present invention, independent claim 1 recites a laser oscillation apparatus including wavelength change means for driving a wavelength selection element and changing an oscillation wavelength of a laser beam to a target value, calculation means for

calculating a drift amount of the oscillation wavelength generated immediately after oscillation starts, and a controller for determining whether a difference between the oscillation wavelength and the target value exceeds a predetermined value. When the difference does not exceed the predetermined value, the controller controls the wavelength change means on the basis of the calculated drift amount so as to have the oscillation wavelength be the target value, and causes the wavelength change means to oscillate the laser beam without emitting a test laser beam to output the laser beam externally of the apparatus.

In another aspect of the present invention, independent claim 15 recites an exposure apparatus using a laser oscillation apparatus as a light source. The laser oscillation apparatus includes wavelength change means for driving a wavelength selection element and changing an oscillation wavelength of a laser beam to a target value, calculation means for calculating a drift amount of the oscillation wavelength generated immediately after oscillation starts, and a controller for determining whether a difference between the oscillation wavelength and the target value exceeds a predetermined value. When the difference does not exceed the predetermined value, the controller controls the wavelength change mens on the basis of the calculated drift amount so as to have the oscillation wavelength be the target value, and causes the laser oscillation apparatus to oscillate the laser beam for exposing the substrate without emitting a test laser beam.

In a further aspect of the present invention, independent claim 34 recites a laser oscillation apparatus including wavelength change means for driving a wavelength selection element and changing an oscillation wavelength of a laser beam to a target value, calculation

means for calculating a drift amount of the oscillation wavelength generated immediately after oscillation starts, and a controller for determining whether an idle time for stopping an oscillation exceeds a predetermined value. When the idle time does not exceed the predetermined value, the controller controls the wavelength change means on the basis of the calculated drift amount so as to have the oscillation wavelength be the target value, and causes the wavelength change means to oscillate the laser beam without emitting a test laser beam to output the laser beam externally of the apparatus.

In still another aspect of the present invention, independent claim 36 recites an exposure apparatus using a laser oscillation apparatus as a light source. The laser oscillation apparatus includes wavelength change means for driving a wavelength selection element and changing an oscillation wavelength of a laser beam to a target value, calculation means for calculating a drift amount of the oscillation wavelength generated immediately after oscillation starts, and a controller for determining whether an idle time for stopping an oscillation exceeds a predetermined value. When the idle time does not exceed the predetermined value, the controller controls the wavelength change means on the basis of the calculated drift amount so as to have the oscillation wavelength be the target value, and causes the laser oscillation apparatus to oscillate the laser beam for exposing the substrate without emitting a test laser beam.

Accordingly, the present invention can provide, for example, a laser oscillation apparatus having a driver for driving a wavelength selection element and changing an oscillation wavelength of a laser beam to a target value, and an exposure apparatus having the laser oscillation apparatus.

In one aspect, as recited in independent claims 1 and 15, the present invention provides an arrangement in which a controller determines whether or not a difference between a wavelength and a target value exceeds a predetermined value. When the difference does not exceed the predetermined value, the controller can control the wavelength change means on the basis of the calculated drift amount so as to have the oscillation wavelength be the target value, and cause the wavelength change means to oscillate the laser beam without emitting a test laser beam to output the laser beam externally of the apparatus. In this manner, the number of emissions of the test laser beam regarding the laser oscillation apparatus can be decreased. As a result, the present invention can prevent a lowering of the productivity of the exposure apparatus having the laser oscillation apparatus.

In another aspect, as recited in independent claims 34 and 36, the present invention provides an arrangement in which a controller can determine whether or not an idle time for stopping an oscillation exceeds a predetermined value. When the idle time does not exceed the predetermined value, the controller controls the wavelength change means on the basis of the calculated drift amount so as to have the oscillation wavelength be the target value, and cause the wavelength change means to oscillate the laser beam without emitting a test laser beam to output the laser beam externally of the apparatus. This aspect of the present invention provides similar advantages to those discussed above with respect to independent claims 1 and 15.

Applicants submit that the cited art does not teach or suggest such features of the present invention, as recited in independent claims 1, 15, 34 and 36.

The Everage et al. patent discloses a laser oscillation apparatus for correcting wavelength chirps by a laser wavelength adjustment mechanism. Applicants submit, however, that the Everage et al. patent does not teach or suggest determining whether or not a difference between a wavelength and a target value exceeds a predetermined value, in the manner of the present invention recited in independent claims 1 and 15, for example. Likewise, Applicants submit that the Everage et al. patent also does not teach or suggest determining whether or not an idle time for stopping an oscillation exceeds a predetermined value, in the manner of the present invention recited in independent claims 34 and 36.

Applicants further submit that the remaining art cited fails to cure the deficiencies noted above with respect to the Everage et al. patent.

The Examiner relies on the Aketagawa patent for disclosing a laser apparatus with a shutter that closes when a wavelength of the laser is outside of a desired range.

The Examiner relies on the Sandstrom patent for disclosing a wavelength measurement device (wavemeter) 12 that includes an internal environment measurement means (for example, a temperature sensor), wherein the wavemeter is corrected based on the temperature measurement.

Further, the Examiner relies on the Tuganv et al. patent for disclosing a display 200, a network interface 102, and a computer network 120 for executing network software.

Applicants submit, however, that none of the Aketagawa, Sandstrom and Tuganov et al. patents teaches or suggests the salient features of Applicants' present invention as recited in independent claims 1, 15, 34 and 36, which have been discussed above. In particular, those patents do not teach or suggest determining whether or not a difference between a wavelength

and a target value exceeds a predetermined value, in the manner of the present invention recited in independent claims 1 and 15, or determining whether or not an idle time for stopping an oscillation exceeds a predetermined value, in the manner of the present invention recited in independent claims 34 and 36. Applicants submit, therefore, that those patents add nothing to the teachings of the Everage et al. patent that would render obvious Applicants' present invention as recited in independent claims 1, 15, 34 and 36.

For the foregoing reasons, Applicants submit that the present invention, as recited in independent claims 1, 15, 34 and 36, is patentably defined over the cited art.

Dependent claims 3, 5-8, 13, 14, 23-25 and 35 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

Applicants further submit that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicants' attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,

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